

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (original): A data read circuit in a semiconductor device, comprising:

selection means for selectively reading output data from a plurality of circuit blocks to shared data lines;

precharging means for precharging said shared data lines;

determination means for determining whether said output data that have been read are to be supplied as output to the outside in accordance with a determination start signal that is synchronized with a selection signal for said selection means; and

discharging means for being controlled by the determination result of said determination means, and being inserted in a cascade connection in data lines that are shared with a succeeding circuit block;

whereby a control operation that if, based on the determination result, the output data that are to be transferred are at a low level, said discharging means is placed in a conductive state to discharging the shared data lines for the succeeding circuit block, and if the data that are to be transferred are at a high level, the shared data lines for the succeeding circuit block is precharged with said precharging means, is successively executed, as far as the lowest-order circuit block, to thereby supply data of a logic level that corresponds to said output data as output.

2. (original): A data read circuit according to claim 1, wherein:
- said circuit block is a bank block of a memory circuit;
- said selection means comprises a row decoder, horizontal lines, and a column decoder;
- said selection signal is a horizontal line; and
- said shared data lines are vertical lines.
3. (currently amended): A data read circuit in a semiconductor device, comprising:
- a plurality of banks each having multiport memory cells for transferring data of each memory cell through a single bit line in accordance with a single-end scheme;
- determination means for determining, in accordance with a determination start signal that is synchronized with a word line signal, whether data in each bank that are read to said single bit line are to be supplied as output ~~to the outside~~;
- discharging means that enters a conductive state when ~~the a~~ determination result of said determination means ~~indicate~~indicates that output is possible, for discharging the single bit line of ~~the a~~ succeeding bank; and
- precharging means for precharging said single bit line; and
- read means that is interposed between said banks;
- whereby a control operation, based on the determination result of said determination means ~~of this particular bank~~, for determining whether data transfer by said read means in the succeeding bank is allowed, is successively executed, as far as the lowest-order bank, to perform a desired data transfer.

4. (currently amended): A data read circuit of a semiconductor device, comprising:
a plurality of banks each having multiport memory cells for transferring data of each memory cell through a single bit line in accordance with a single-end scheme; and
read means that is interposed between said banks for supplying ~~as output to the outside~~ data that have been read to a single bit line for each of said banks;
said read means including:
a single NOR means for receiving as input said data and a determination start signal for determining, in synchronization with a word line signal, whether said data are to be transferred; and
discharging means for discharging ~~the~~ a lower-order bit line in accordance with ~~the~~ an output result of the NOR means;
whereby a control operation, based on ~~the~~ a determination result of said NOR means ~~of this particular bank~~, for determining whether data transfer by said read means in ~~the~~ a succeeding bank is allowed, is successively executed, as far as the lowest-order bank, to thereby perform a desired data transfer.

5. (original): A data read circuit in a semiconductor device, comprising:
a plurality of banks having read-only memory cells for transferring data of each cell through a single bit line; and

read means that is interposed between said banks for supplying data that have been read to a single bit line for each of said banks as output to the outside;

said read means including:

a single NOR means for receiving as input said data and a determination start signal for determining, in synchronization with a word line signal, whether said data are to be transferred; and

discharging means for discharging the lower-order bit line in accordance with the output result of said NOR means;

whereby a control operation, based on the determination result of said NOR means of a particular bank, for determining whether data transfer by said read means of the succeeding bank is allowed, is successively executed, as far as the lowest-order bank, to thereby perform execute the desired data transfer.

6. (currently amended): A data read circuit in a semiconductor device, comprising:
a plurality of banks each constituted by predetermined logic circuits;
data output lines provided inside each of said banks;
wired OR circuits in which transistors each controlled by a predetermined input signal are connected by wired OR to said data output lines; and

read means that is interposed between said banks for reading output data of said wired OR circuits ~~to the outside~~;

said read means including:

a single NOR means for receiving as input said output data and a determination start signal that is of the opposite phase of a precharging signal to precharge one of said data output linelines for determining whether or not said output data are to be transferred; and

discharging means for discharging a lower-order data output line in accordance with ~~the~~ an output result of the NOR means;

whereby a control operation, based on ~~the~~ a determination result of said NOR means ~~of this particular bank~~, for determining whether data transfer by said read means in ~~the~~ a succeeding bank is allowed, is successively executed, as far as the lowest-order bank, to thereby perform a desired data transfer.

7. (currently amended): A data read circuit of a semiconductor device, comprising:
a plurality of banks each having multiport memory cells for transferring data of each memory cell through a single bit line in accordance with a single-end scheme; and

read means that is interposed between said banks for supplying ~~as output to the outside~~ data that have been read to a single bit line for each of said banks;

said read means including:

a clocked inverter for supplying as output said data when a determination start signal, which is synchronized with a word line signal, for determining whether or not said data are to be transferred is in an active state;

discharging means for discharging ~~the~~ a lower-order bit line in accordance with ~~the~~ an output result of said clocked inverter; and

discharge prevention means for preventing the discharging-operation of said discharging means and holding the input of said clocked inverter at a precharged potential when said determination start signal is in an inactive state;

whereby a control operation, based on the output result of said clocked inverter ~~of this particular bank~~, for determining whether data transfer by said read means in ~~the~~ a succeeding bank is allowed, is successively executed, as far as the lowest-order bank to thereby perform a desired data transfer.

8. (currently amended): A data read circuit in a semiconductor device, comprising:
a plurality of banks each having multiport memory cells for transferring data of each memory cell through a single bit line in accordance with a single-end scheme; and

read means that is interposed between said banks for supplying ~~as output to the outside~~ data that have been read to a single bit line for each of said banks;

said read means including:

a differential sense amplifier for comparing said data that are transferred with a reference signal when a determination start signal, which is synchronized with a word line signal, for determining whether or not said data are to be transferred is in an active state;

a clocked inverter for receiving as input said data that are supplied from said differential sense amplifier and supplying said data as output when said determination start signal is in an active state;

discharging means for discharging ~~the~~ a lower-order bit line in accordance with ~~the~~ an output result of said clocked inverter; and

discharge prevention means for preventing the discharging ~~operation~~ of said discharging means and holding the input of said clocked inverter at a precharged potential when said determination start signal is in an inactive state;

whereby a control operation, based on the output result of said clocked inverter ~~in said determination means of this bank~~, for determining whether data transfer by said read means in ~~the~~ a succeeding bank is allowed, is successively executed, as far as the lowest-order bank, to thereby perform desired data transfer.

9. (currently amended): A data read circuit according to claim 3, wherein said read means includes:

a single bit line that is selectively precharged by a precharging transistor and a precharge holding transistor that is connected in parallel with said precharging transistor;

wherein the single NOR means comprises a NOR circuit having its input terminal connected to said bit line and the signal line of said determination start signal, and its output terminal connected to the gate electrode of said precharge holding transistor; and

wherein the discharging means comprises a discharging transistor having its gate electrode connected to the output terminal of said NOR circuit, its drain electrode connected to ~~said~~ a lower-order bit line, and its source electrode connected to the ground potential.

10. (currently amended): A data read circuit according to claim 4, wherein said read means includes:

a single bit line that is selectively precharged by a precharging transistor and a precharge holding transistor that is connected in parallel with said precharging transistor;

wherein the single NOR means comprises a clocked inverter having its data input terminal connected to said bit line, one of its clock input terminals connected to the determination start signal, the other of its clock input terminals connected to a polarity-inverted signal of said determination start signal, and its output terminal connected to the gate electrode of said precharge holding transistor;

an output holding transistor having its drain electrode connected to the output terminal of said clocked inverter, its source electrode connected to ground, and its gate electrode connected to the polarity-inverted signal of said determination start signal; and

wherein the discharging means comprises a discharging transistor having its gate electrode connected to the output terminal of said clocked inverter, its drain electrode connected to said lower-order bit line, and its source electrode connected to ground.

11. (currently amended): A data read circuit according to claim 5, wherein said read means includes:

a single bit line that is selectively precharged by a precharging transistor and a precharge holding transistor that is connected in parallel with said precharging transistor;

wherein the single NOR means comprises a clocked inverter having its data input terminal connected to said bit line, one of its clock input terminals connected to the determination start signal, the other of its clock input terminals connected to a polarity-inverted signal of said determination start signal, and its output terminal connected to the gate electrode of said precharge holding transistor;

an output holding transistor having its drain electrode connected to the output terminal of said clocked inverter, its source electrode connected to ground, and its gate electrode connected to the polarity-inverted signal of said determination start signal; and

wherein the discharging means comprises a discharging transistor having its gate electrode connected to the output terminal of said clocked inverter, its drain electrode connected to said lower-order bit line, and its source electrode connected to ground.

12. (currently amended): A data read circuit according to claim 6, wherein said read means includes:

a single bit line for being selectively precharged by a precharging transistor and a precharge holding transistor connected in parallel with said precharging transistor;

wherein the single NOR means comprises a voltage comparator having its positive input terminal connected to said bit line, its negative input terminal connected to a reference signal line, and its control terminal connected to a determination start signal line; and

a clocked inverter having its data input terminal connected to the output terminal of said voltage comparator, one of its clock input terminals connected to said determination start signal,

the other of its clock input terminals connected to the polarity-inverted signal of said determination start signal; and its output terminal connected to the gate electrode of said precharge holding transistor;

an output holding transistor having its drain electrode connected to the output terminal of said clocked inverter, its source electrode connected to the ground potential, and its gate electrode connected to the polarity-inverted signal of said determination start signal; and
wherein the discharging means comprises a discharging transistor having its gate electrode connected to the output terminal of said clocked inverter, its drain electrode connected to ~~said a~~ lower-order bit line, and its source electrode connected to the ground potential.

13. (currently amended): A data read circuit according to claim 9, wherein the drive capability of said discharging transistor is preset to a level that equals or surpasses the drive capability of ~~said a~~ plurality of circuit blocks within the semiconductor device.

14. (currently amended): A data read circuit according to claim 10, wherein the drive capability of said discharging transistor is preset to a level that equals or surpasses the drive capability of ~~said a~~ plurality of circuit blocks within the semiconductor device.

15. (currently amended): A data read circuit according to claim 11, wherein the drive capability of said discharging transistor is preset to a level that equals or surpasses the drive capability of ~~said a~~ plurality of circuit blocks within the semiconductor device.

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16. (currently amended): A data read circuit according to claim 12, wherein the drive capability of said discharging transistor is preset to a level that equals or surpasses the drive capability of ~~said~~ a plurality of circuit blocks within the semiconductor device.